

MISZCZAK ET AL.
"Ultra Low Carbon Metal-Core Weld Wire"
Atty. Docket No. 8313-60

Appl. No. 09/227,242
Examiner M. Elve
Art Unit 1725

REMARKS

Request for Consideration, Claim Status

5 The Official actions of 23 October 2000 and 5 March 2001 have been considered carefully. Reconsideration of the claimed invention in view of the amendment above and discussion below is respectfully requested. Claims 1 and 3-27 are pending.

Objection to Premature Examination of CPA

10 Applicant filed a Continued Prosecution Application (CPA) on 17 February 2001 in response to the final Official action of 23 October 2000 in order to ensure consideration of an affidavit under 37 CFR 1.132, filed herewith, since the submission of an affidavit after final is untimely. The affidavit and amendment submitted herewith were not complete at the time of filing the CPA and thus were not submitted on 17 February 2001.

15 On 5 March 2000, little more than two weeks after filing the CPA, the Examiner mailed a non-final office action re-asserting the rejection of 23 October 2000, without affording the applicant an opportunity to submit a complete response addressing the issues raised in the Official action of 23 October 2000.

20 The Applicant hereby objects to the Official action of 5 March 2001 as being pre-mature and requests that it be withdrawn. The close temporal proximity of the mailing of the Official action of 5 March 2001 to the filing date of the CPA on 17 February 2001 suggests that the application was examined out of order. Moreover, no effort was made on the part of the examiner to contact applicant's representative to inquire as to whether a response to the Official action of 23 October 2000 would be filed, as any reasonable examiner would expect an applicant to do upon filing a CPA.

Allowability of Claimed Inventions

Claims 1-27 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,824,992 (Nagarajan) in view of U.S. Patent No. 5,192,851 (James) and U.S. Patent No. 5,365,036 (Crockett). Official Action, 23 October 2000, para. 2.

The Examiner concedes that the claimed ranges are outside that of the prior art but reasserts that the claimed inventions are prima facie obvious due to the close proximity of the ranges disclosed in the prior art, and particularly the ranges disclosed by Nagarajan. Official Action, 23 October 2000, para. 4.

The present invention relates generally to metal-core weld wires having reduced fume production resulting, in at least some embodiments, from a reduced carbon content in the sheath thereof. Claim 1 recites a metal-core weld wire having a low carbon steel sheath with "... a carbon content less than 0.005 % C" Reducing the carbon content in the sheath of metal-core weld wires to within the ranges recited in the inventions of independent Claims 1 and 21, discussed further below, substantially reduces the amount of fumes generated.

It is noted that none of the prior art references (Nagarajan, James et al. and Crockett) disclose or suggest alone or in combination reducing fumes in a metal core wire by reducing the carbon content in the sheath thereof. The Examiner's alleged prima facie case of obviousness is based solely on disclosure in Nagarajan of a weld wire having a sheath carbon content between 0.005-0.150 %, the lower limit being near the upper limit recited in Claim 1.

Nagarajan teaches reducing the oxygen content in metal core weld wires by using low oxygen iron powders and/or reduced core fill percentages. The disclosure of Nagarajan relied upon by the Examiner for teaching a sheath carbon content as low 0.005 % is merely general background disclosure about metal core weld wires and is not even one of the embodiments of the invention of Nagarajan. The low oxygen weld wire embodiments of Nagarajan in fact include carbon contents in the sheath of not less than 0.015 %, which is

substantially greater than 0.005 % recited in Claim 1 of the present invention.

The Examiner does not rely on James et al. or Crockett for teaching carbon contents in the sheath in the ranges recited in the claimed inventions. James is cited for teaching the "... use of Si and Al" James et al. disclose nothing about fume reduction in a weld wire and particularly fail to disclose or suggest reducing the carbon content in the sheath to the ranges claimed in the present invention.

The Examiner's reliance on Crockett is ambiguous. The Examiner alleges that it would have been obvious to "... measure fume generation as taught by Crockett et al. for the Nagarajan et al. wire because it would characterize the welding wire and deposit more completely." Official action 23 October 2000, para. 2.

The independent claims of the present invention however recite nothing about "... measuring fume generation ..." as alleged by the Examiner. Claim 1 recites a metal core weld wire having a sheath having "... a carbon content less than 0.005 % C" Moreover, the Examiner's alleged motivation "... to characterize the welding and deposit more completely..." for the dubious combination of Crockett and Nagarajan is nonsensical.

Crockett discloses flux core weld wires with aluminum for reducing fumes. The Examiner alleges that Crockett discloses carbon in the weld wire sheath but does not allege that carbon ranges disclosed by Crockett render the carbon ranges of the present invention obvious. More importantly, Crockett does not disclose or suggest any nexus or relationship between sheath carbon contents and fume generation. The Examiner's attempted reliance on Crockett admits that Nagarajan alone does not support a rejection of the claims for obviousness.

There is absolutely no teaching or suggestion in Nagarajan to reduce the sheath carbon content below 0.005 % as recited in Claim 1, for any reason. Nagarajan alone or in combination with Crockett and James et al. does not suggest reducing the sheath carbon content to "... less than 0.005 % ..." as recited in Claim 1. Claim 1 and the Claims that depend

therefrom are therefore believed to be allowable over Nagarajan, Crockett and James et al. In re Antonie, 195 USPQ 6, 9 (C.C.P.A. 1977) (Failure to recognize a result-effective variable or range outside a known range is an exception to the rule of the presumption of obviousness.).

5 Claim 2 recites the steel sheath comprising "... not more than approximately 0.004 % C ...", which carbon content is further below the range disclosed by Nagarajan. Claim 2 is therefore also allowable over the prior art.

10 According to another aspect of the invention, the low fume generating metal-core weld wires of the present invention, for example those having sheath carbon contents of not more than 0.008 % C, have small amounts of carbon added to the core composition to improve the mechanical properties of the weld deposit produced thereby, including for example improved toughness and impact strength.

15 Claim 3, dependent from Claim 1, recites "... the total weight of the metal-core weld wire comprises between approximately 0.005 % C and approximately 0.013 % C." Claim 1 limits the amount of carbon in the sheath to "... less than 0.005 % C ...", and thus the balance of the carbon is in the metal-core composition. This combination is not disclosed or suggested by Nagarajan alone or in combination with Crockett and James et al.

20 Claim 8, dependent from Claim 1, recites "... the metal-core composition comprising not more than approximately 0.0047 % C" This core carbon content range in combination with a carbon content in the sheath that is "... less than 0.005 % C ..." as recited in Claim 1 is not disclosed or suggested by Nagarajan, Crockett or James.

25 Claim 11, also dependent from Claim 1, recites "... the metal-core composition is between approximately 17 % and approximately 19 % of the total weight of the metal-core weld wire, the metal-core composition comprising not more than approximately 0.0046 % C." This core carbon content range in combination with a carbon content in the sheath that is "... less than 0.005 % C ..." as recited in Claim 1 also is not disclosed or suggested by Nagarajan, Crockett or James.

Claim 15 depends from Claim 12 and recites a range similar to that recited in Claim 11.

Claims 3, 8, 11 and 15 are therefore believed to be in condition for allowance.

5 Nagarajan, Crockett and James also fail to disclose or suggest low fume metal-core weld wires having the core composition recited in Claims 4, 8-13 and 16, and particularly the various combinations of Fe-Mn, Fe-Si, Fe-Mn-Si and Fe-Ti in the core composition, which provide the core carbon content in the ranges recited in the base or intervening claims. The disclosure in the prior art of these elements in isolation is not the same as the compounds recited in the Claims.

10 Claims 4, 9, 10-13 and 16 are therefore believed to be in condition for allowance.

15 Regarding Claims 17-20, Nagarajan, Crockett and James also fail to disclose or suggest metal-core weld wires having fume generation rates recited in said claims. The Examiner's rejection does not specifically address these limitations. Claim 17-20, which are dependent from Claim 1, are therefore believed to be in condition for allowance.

20 Independent Claim 21 recites a "low fume metal-core weld wire" comprising "... a low carbon steel sheath having a carbon content of not more than approximately 0.008 % C ... the metal-core composition comprises between approximately 0.0020 % C and approximately 0.0047 % C based on the total weight of the metal-core weld wire."

25 Nagarajan, Crockett and James fail to disclose or suggest a "low fume metal-core weld wire" having a sheath and metal-core with carbon content ranges recited in Claim 21 and the Claims that depend therefrom.

 As noted above, Nagarajan is concerned with reducing the oxygen content of metal-core weld wires by substantially reducing the core fill percentage and by using low oxygen content iron powders as a core constituent. Crockett discloses flux-cored weld wires having aluminum for reducing fume generation but fails to disclose or suggest anything about

reducing fumes in metal-core weld wires by reducing the carbon content in the sheath thereof. James discloses a weld wire formulated specifically for pulsed arc welding and otherwise fails to compensate for the deficiencies of Nagarajan and Crockett.

5 Claim 21 and dependent Claims 22-27 are therefore believed to be allowable over Nagarajan, Crockett and James.

10 Claim 22, dependent from Claim 21, recites "... the metal-core composition between approximately 17 % and approximately 19 % of the total weight of the metal-core weld wire, the metal-core composition comprising not more than approximately 0.0046 % C based on the total weight of the metal-core weld wire." These ranges further distinguish over Nagarajan, Crockett and James and thus Claim 22 is believed to be in condition for allowance for these additional reasons.

15 Nagarajan, Crockett and James also fail to disclose or suggest low fume metal-core weld wires having the core composition recited in Claims 23, 24 and 26-27, and particularly the various combinations of Fe-Mn, Fe-Si, Fe-Mn-Si and Fe-Ti in the core composition, which provide the core carbon content in the recited ranges. Claims 23-27 are therefore believed to be in condition for allowance.

Also submitted herewith is an evidentiary declaration under 37 CFR 1.132 drawn to object indicia of non-obviousness, and particularly to the commercial success of the claimed invention discussed further below.

Discussion of Attached Affidavit Under 37 CFR 1.132

An Affidavit with supporting evidence is submitted herewith under 37 CFR 1.132 for consideration by the Examiner. *Cable Elec. Prods., Inc. v. Genmark, Inc.* 226 USPQ 881, 887 (Fed. Cir 1985) (Evidence of secondary considerations must always be considered; not merely when the examiner remains in doubt after reviewing the prior art.).

The attached Affidavit and supporting factual evidence establish that the subject matter of the claimed inventions overcome problems in the art: namely, low fume producing metal-core weld wires that comply with industry strength and toughness specifications. The low fume weld wires of the present invention were developed partly in response to industry demand, and address problems heretofore unsolved by others.

The affidavit and supporting evidence also establish that the metal-core weld wires of the present invention are commercially successful. Particularly, the sales of low fume metal-core weld wires of the present invention were substantial upon introduction thereof into the marketplace because they substantially reduced fumes without loss of performance characteristics, which is what industry required. Sales grew substantially the second year of sales, and continues to grow.

Particularly relevant to the commercial success of the present invention is the fact that, for at least one large customer's applications, the metal-core weld wires of the present invention substantially displaced the use of flux-core weld wires, which generate substantial amounts of fumes.

The Affidavit and supporting evidence establish (by comparison of the Data sheets and claim limitations) a nexus between the subject matter of the claimed inventions and the commercial embodiments thereof. The Affidavit and supporting evidence establish further that the commercial success is attributable to the claimed invention. Particularly, the metal-core weld wires are commercially successful because they have reduced fume production

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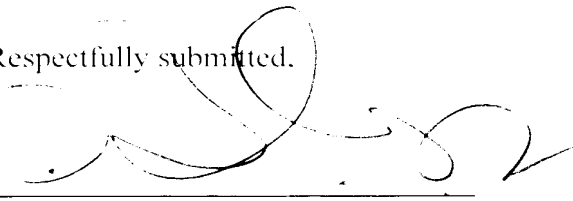
without loss of performance. *Applied Materials Inc. v. Advanced Semiconductor Material Am. Inc.*, 40 USPQ2d 1481, 1486 (Fed. Cir. 1986)(All embodiments within the claims need not be commercially successful.).

5 The remarks, above especially when taken in consideration with the enclosed Affidavit under 37 CFR 1.132 overwhelmingly defeat the Examiner's tenuous allegations of obviousness, which for independent Claims 1 and 21 rests substantively on the sole reference to Nagarajan. *In re Oetiker*, 24 USPQ2d 1443 (Fed. Cir. 1992) (The ultimate determination of patentability must be based on consideration of the entire record, by preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary
10 considerations.). See MPEP §§ 716.01(d) and 2144.08.

In view of the amendments and discussion above, it is submitted that all pending claims of the present application are now in condition for allowance. Kindly withdraw any rejections and objections thereto and allow the claims of the present application to issue as a United States Patent.

15 The undersigned requests a telephone interview upon the Examiner's careful review of this amendment, before preparing an Official action in response thereto.

Respectfully submitted.


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(Amended) The metal
between approximately 17% oxygen
weld wire, the metal-core
approximately 0.0025%
the metal-core weld wire

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composition comprising
approximately 1.5%

27. (Amended) The metal-core
composition comprising not more than
approximately 3.60% Fe-Si, not
approximately 16.30% Fe-Mn-Si,
approximately 0.66% Fe-Ti, and the

MARKED-UP AMENDED CLAIMS

3. (Amended) The metal-core weld wire of Claim 1, the total weight of the
metal-core weld wire comprises not more than [between approximately 0.005% C and]
approximately 0.013% C.

8. (Amended) The metal-core weld wire of Claim 1, the metal-core
composition comprising not more than [comprises between approximately 0.0020% C and]
approximately 0.0047% C.

11. (Amended) The metal-core weld wire of Claim 1, the metal-core
composition is between approximately 17% and approximately 19% of the total weight of
the metal-core weld wire, the metal-core composition comprising not more than [comprises
between approximately 0.0025% C and] approximately 0.0046% C.

12. (Amended) The metal-core weld wire of Claim 1, the metal-core
composition comprises between approximately 17% and approximately 19% of a total weight
of the metal-core weld wire, and the metal-core composition comprising not more than
[comprises between approximately 1.46% Fe-Mn and] approximately 1.62% Fe-Mn.

13. (Amended) The metal-core weld wire of Claim 12, the metal-core
composition comprising not more than [comprising between approximately 2.85% Fe-Si and]
approximately 14.26% Fe-Mn-Si, not more than [between approximately 12.90% Fe-Mn-Si and]
approximately 0.58% Fe-Ti, and the balance Fe powder.

15. (Twice Amended) The metal-core weld wire of Claim 12, the metal-core



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